The results of the SIMMOD model simulations are summarized in this section, both in tabular and in graphic form. The tables give a detailed picture for each demand management and airport runway configuration where arrival, departure and weighted average delays (minutes per flight) are shown for each weather condition. In contrast, the graphs show only the weighted average delays (arrivals and departures combined) to allow a clear visual comparison of the impact of the various alternatives.

6.1 DEMAND MANAGEMENT ALTERNATIVES

The different demand management alternatives were described in Section 4.5 and are briefly summarized below. The delays resulting from these alternatives are shown in Table 6-1 and plotted in Figures 6-1 to 6-4.

- *All Existing – 1999.* Uses the existing layout for all three airports with 1999 traffic levels. This is the validated Base Case.
- *Sensitivity Case S1- 1999*. Uses the existing layout for all airports with 1999 SFO traffic levels reduced by moving corporate GA operations from SFO to OAK, and by replacing turboprop operations at SFO with half the number of regional jet operations.
- *Sensitivity Case S2- 1999*. Uses the existing layout for all airports with 1999 SFO traffic levels reduced by moving corporate GA operations from SFO to OAK, and by replacing turboprop operations at SFO by half the number of regional jets. In addition, flights from Southern California are further reduced by 26% (equivalent to a substitution of B-757 for B-737)

For 2010 and 2020 demand management alternatives, the use of SOIA/PRM procedures are included.

- *All Existing – 2010.* Uses the existing runway layout for all three airports with 2010 traffic forecasts
- *Sensitivity Case S2 Demand - 2010*. Uses the existing runway layout for all airports with 2010 SFO traffic reduced by moving corporate GA operations from SFO to OAK, and by replacing turboprop operations at SFO with half the number of regional jets. In addition, the flights from Southern California are further reduced by 26% (equivalent to a substitution of B-757 for B-737).
- *Sensitivity Case S3 Demand - 2010*. Uses the existing runway layout for all airports with the 2010 SFO traffic reduced by moving corporate GA operations from SFO to OAK, by replacing turboprop operations in SFO by half the number of regional jets, and by reducing the flights from Southern California by 26% (equivalent to a substitution of B-757 for B-737). In addition, a third of the flights to/from Southern California (BUR, LAX, ONT, SAN, SBA, and SNA) are moved from SFO to OAK, resulting in about the same number of flights to these cities as in 1999.

- *All Existing – 2020.* Uses the existing runway layout for all three airports with the 2020 traffic forecast
- *Sensitivity Case S2 Demand - 2020*. Uses the existing runway layout for all airports with the 2020 SFO traffic reduced by moving corporate GA operations from SFO to OAK, and by replacing turboprop operations in SFO with half the number of regional jets. In addition, flights from Southern California are further reduced by 26% (equivalent to a substitution of B-757 for B-737).
- *Sensitivity Case S3 Demand - 2020*. Uses the existing layout for all airports with the 2020 SFO traffic reduced by moving corporate GA operations from SFO to OAK, by replacing turboprop operations in SFO with half the number of regional jets and sending them to OAK, and by reducing flights from Southern California by 26% (equivalent to a substitution of B-757 for B-737). In addition, a third of the flights to/from Southern California (BUR, LAX, ONT, SAN, SBA, and SNA) are moved from SFO to OAK, resulting in about the same number of flights to these cities as in 1999.

Table 6-1
Summary of Demand Management Alternatives – Average Delays in Minutes

Alternatives	San Francisco			Oakland			San Jose			Bay Area Airports		
	Arr.	Dep.	Total	Arr.	Dep.	Total	Arr.	Dep.	Total	Arr.	Dep.	Total
1999 Existing												
West-VFR	2.31	4.74	3.51	0.51	1.13	0.86	0.63	2.02	1.38	1.57	3.21	2.42
West-IFR	148.	5.78	77.8	1.14	0.88	0.99	0.52	1.90	1.26	86.02	3.66	43.20
SE-IFR	93.7	8.61	51.5	1.58	3.80	2.82	1.50	4.33	3.03	54.66	6.43	29.59
Average	29.0	5.10	17.1	0.65	1.25	0.99	0.69	2.20	1.50	17.00	3.47	9.96
1999 S1												
West-VFR	1.94	3.63	2.79	1.28	2.81	2.11	0.88	2.72	1.87	1.54	3.18	2.40
West-IFR	69.5	4.08	36.7	1.70	1.05	1.35	0.51	2.00	1.31	36.79	2.72	19.05
SE-IFR	29.7	28.18	28.9	2.55	4.34	3.52	1.50	4.73	3.24	16.47	15.87	16.16
Average	13.5	4.96	9.24	1.41	2.67	2.09	0.91	2.84	1.95	7.61	3.81	5.63
1999 S2												
West-VFR	1.94	3.22	2.58	1.28	3.04	2.23	0.88	2.98	2.01	1.53	3.11	2.35
West-IFR	46.3	3.0	24.6	1.70	1.07	1.36	0.51	1.54	1.07	24.08	2.06	12.59
SE-IFR	8.7	11.76	10.2	2.55	4.66	3.69	1.50	4.24	2.98	5.46	7.88	6.72
Average	8.96	3.62	6.29	1.41	2.87	2.20	0.91	2.99	2.03	5.13	3.25	4.15
2010 Exist. + SOIA												
West-VFR	4.20	8.74	6.46	1.13	3.74	2.56	1.24	1.76	1.50	2.82	5.90	4.39
West-IFR	199.	4.2	102.	2.45	1.13	1.73	0.96	2.08	1.52	109.0	2.87	54.70
SE-IFR	144.	53.54	99.1	5.11	4.48	4.77	1.78	3.09	2.44	79.81	29.30	53.96
Average	22.9	11.02	17.0	1.53	3.44	2.57	1.27	1.89	1.58	13.09	7.00	9.97
2010 S2 + SOIA												
West-VFR	3.49	7.83	5.66	1.19	4.53	2.98	1.25	1.48	1.37	2.33	5.43	3.92
West-IFR	118.	3.5	61.1	2.88	1.72	2.26	0.97	1.88	1.43	59.23	2.59	30.25
SE-IFR	76.3	61.39	68.8	2.79	4.83	3.88	1.79	2.49	2.14	38.52	30.75	34.55
Average	14.0	10.62	12.3	1.50	4.18	2.94	1.28	1.58	1.43	7.57	6.64	7.09
2010 S3 + SOIA												
West-VFR	2.85	3.69	3.27	1.27	12.63	7.31	1.24	1.61	1.43	1.95	6.63	4.35
West-IFR	71.1	2.29	36.7	7.07	3.00	4.91	0.97	2.14	1.56	33.60	2.53	17.69
SE-IFR	33.1	39.42	36.2	4.86	8.91	7.01	1.80	2.94	2.37	16.46	20.30	18.43
Average	8.35	5.63	6.99	2.23	11.16	6.98	1.27	1.75	1.51	4.68	6.91	5.82
2010 Exist. + Tech												
West-VFR	4.07	6.16	5.11	0.78	2.46	1.70	1.22	2.08	1.65	2.66	4.28	3.48
West-IFR	193.	4.57	99.8	2.38	1.10	1.68	0.92	1.94	1.43	105.9	3.05	53.30
SE-IFR	103.	61.85	82.6	2.86	4.59	3.81	1.78	3.20	2.49	57.07	33.60	45.06

Table 6-1
Summary of Demand Management Alternatives – Average Delays in Minutes (Cont'd)

Alternatives	San Francisco			Oakland			San Jose			Bay Area Airports		
	Arr.	Dep.	Total	Arr.	Dep.	Total	Arr.	Dep.	Total	Arr.	Dep.	Total
Average	20.2	9.22	14.7	1.11	2.40	1.82	1.25	2.16	1.71	11.50	5.84	8.60
2020 Exist. + SOIA												
West-VFR	15.7	98.20	56.7	1.45	13.27	7.79	2.28	5.17	3.73	9.01	53.36	31.60
West-IFR	314.	11.07	163.	3.78	2.07	2.86	9.34	4.11	6.71	165.4	6.95	84.75
SE-IFR	251.	112.1	182.	27.9	6.49	16.4	3.39	9.34	6.38	138.1	59.18	97.91
Average	45.6	94.15	69.7	3.26	11.42	7.64	2.79	5.44	4.12	25.05	50.89	38.21
2020 S2 + SOIA												
West-VFR	11.7	45.43	28.5	1.48	36.95	20.2	2.04	3.13	2.59	6.52	33.42	20.23
West-IFR	253.	6.55	130.	4.60	3.01	3.76	2.04	6.16	4.11	123.9	5.35	63.49
SE-IFR	197.	106.6	151.	5.94	16.83	11.7	3.31	8.35	5.84	97.38	56.57	76.58
Average	35.6	46.73	41.1	2.14	31.37	17.6	2.14	3.73	2.94	18.25	32.39	25.45
2020 S3 + SOIA												
West-VFR	9.06	44.82	26.9	1.66	115.6	61.7	2.04	3.08	2.56	5.09	60.19	33.16
West-IFR	217.	6.97	112.	8.97	16.65	13.0	1.89	5.33	3.62	101.6	9.96	54.92
SE-IFR	162.	94.38	128.	5.45	79.65	44.5	3.31	8.15	5.74	75.99	70.43	73.16
Average	29.2	45.52	37.4	2.83	100.6	54.3	2.13	3.62	2.88	14.64	55.42	35.42

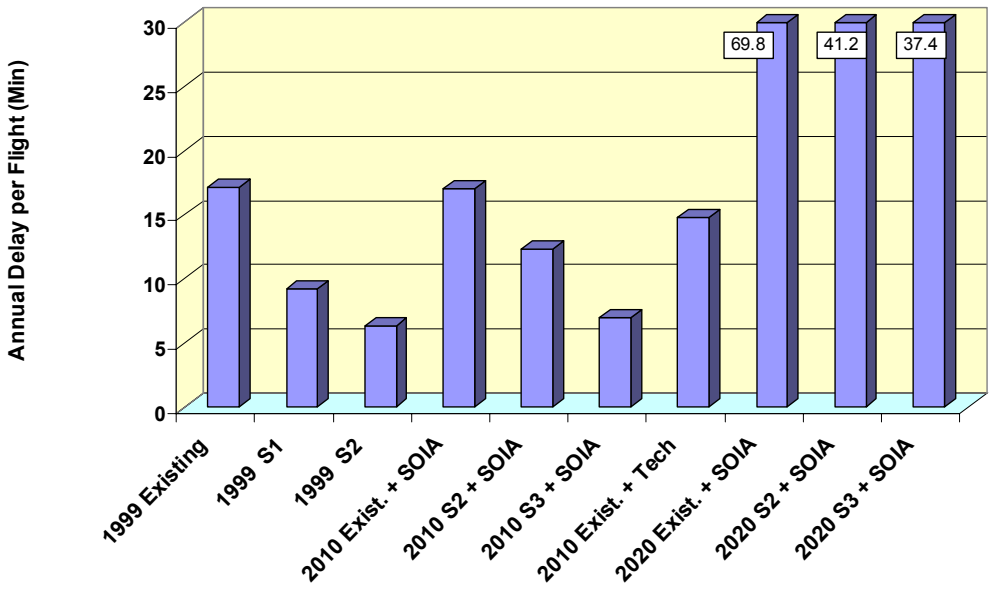


Figure 6-1 San Francisco Airport – Average Delay By Demand Management Alternative

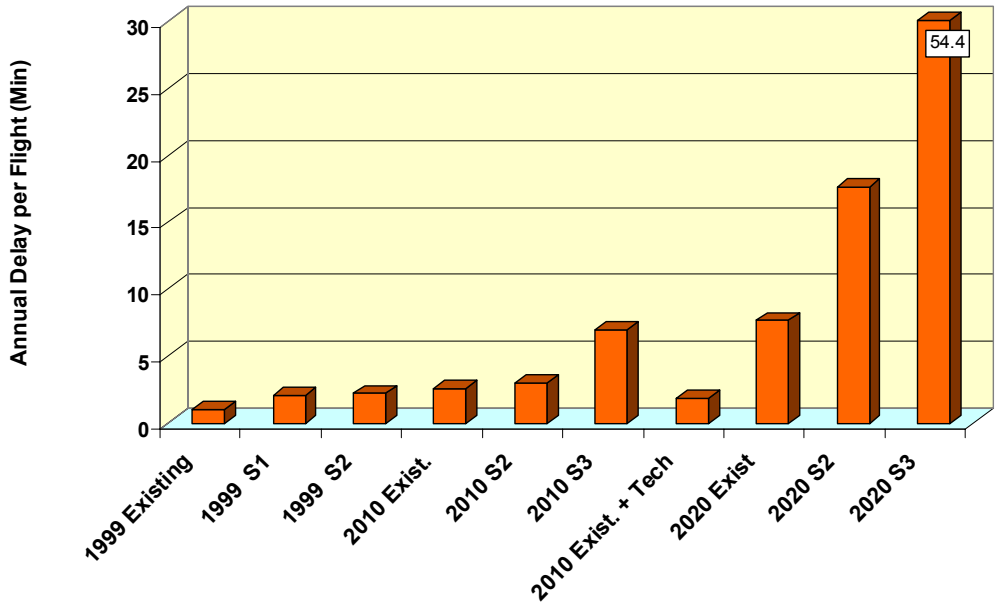


Figure 6-2 Oakland Airport – Average Delay By Demand Management Alternative

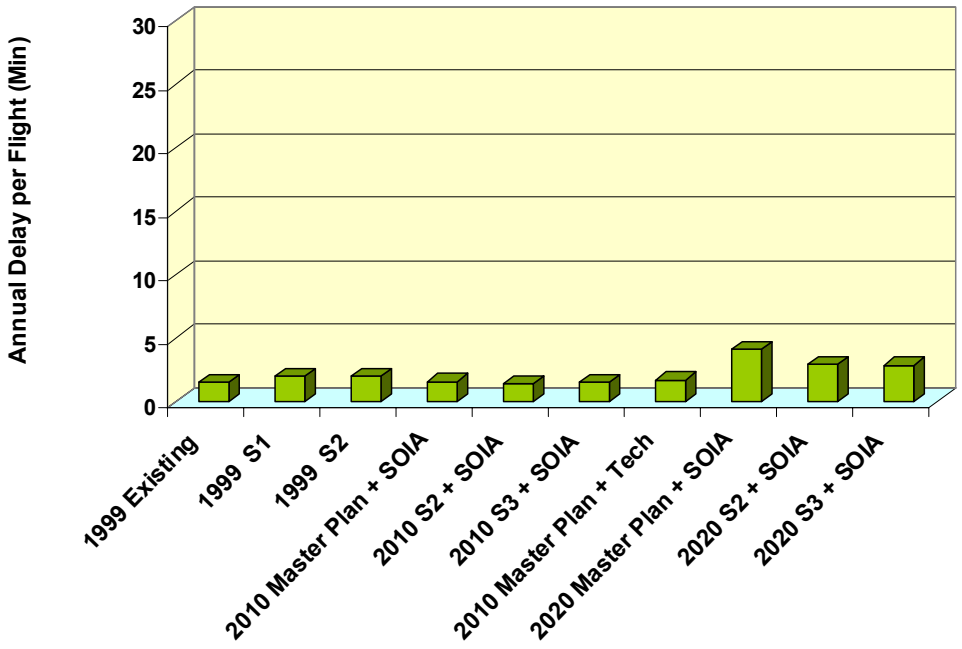
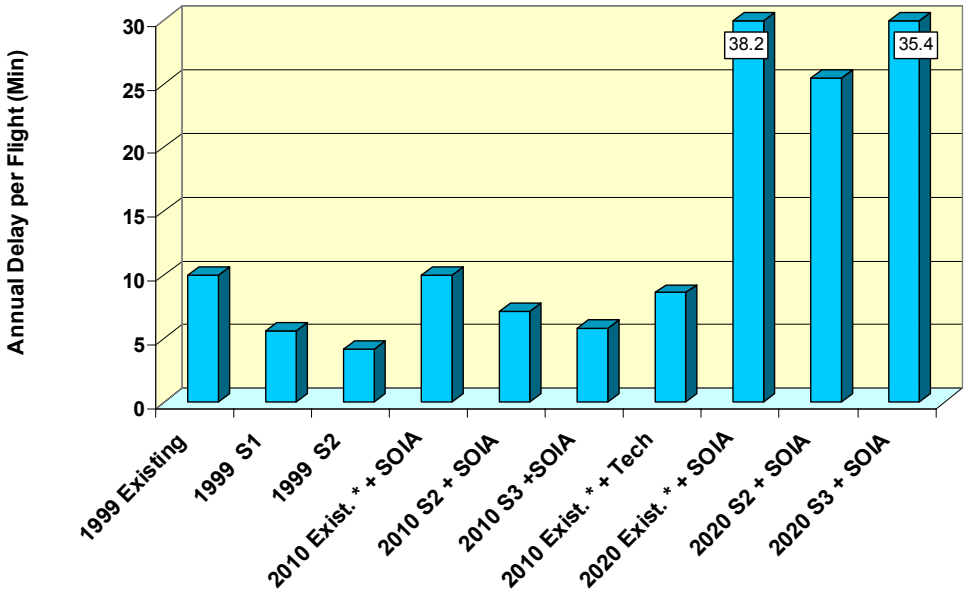


Figure 6-3 San Jose Airport – Average Delay By Demand Management Alternative



***Existing includes the San Jose Master Plan**

Figure 6-4 Bay Area Airports – Average Delay By Demand Management Alternative

6.2 RUNWAY CONFIGURATION ALTERNATIVES

The different runway configuration alternatives were described in Section 5 and are briefly summarized below. The delays resulting from these alternatives are shown in Table 6-2 and plotted in Figures 6-5 to 6-8. In SFO, the situation is somewhat worse in SE IFR than in West IFR because the former uses two runways for departures (10L and 10R), whereas the latter can use three runways (1L, 1R, and 28R).

- *All Existing – 1999.* Uses the existing runway layout for all three airports with 1999 traffic levels. This is the validated Base Case.
- *SFO A3 and OAK Existing - 2010.* Uses the A3 Alternative for SFO, existing OAK airport layout, and second parallel runway for SJC with traffic level per 2010 forecast demand.
- *SFO A3 and OAK Existing - 2020.* Uses the A3 Alternative for SFO, existing OAK airport layout, and second parallel runway for SJC with traffic level per 2020 forecast demand.
- *SFO A3 and OAK Inboard - 2020.* Uses the A3 Alternative for SFO, OAK airport layout with inboard parallel runway, and second parallel runway for SJC with traffic level per 2020 forecast demand.
- *SFO A3 and OAK Outboard - 2020.* Uses the A3 Alternative for SFO, OAK airport layout with outboard parallel runway, and second parallel runway for SJC with traffic level per 2020 forecast demand.
- *SFO F2 and OAK Existing - 2010.* Uses the F2 Alternative for SFO, existing OAK airport layout, and second parallel runway for SJC with traffic level per 2010 forecast demand.
- *SFO F2 and OAK Existing - 2020.* Uses the F2 Alternative for SFO, existing OAK airport layout, and second parallel runway for SJC with traffic level per 2020 forecast demand.
- *SFO F2 and OAK Inboard - 2020.* Uses the F2 Alternative for SFO, OAK airport layout with inboard parallel runway, and second parallel runway for SJC with traffic level per 2020 forecast demand.
- *SFO F2 and OAK Outboard - 2020.* Uses the F2 Alternative for SFO, OAK airport layout with outboard parallel runway, and second parallel runway for SJC with traffic level per 2020 forecast demand.
- *SFO BXR and OAK Existing - 2010.* Uses the BXR Alternative for SFO, existing OAK airport layout, and second parallel runway for SJC with traffic level per 2010 forecast demand.
- *SFO BXR and OAK Existing - 2020.* Uses the BXR Alternative for SFO, existing OAK airport layout, and second parallel runway for SJC with traffic level per 2020 forecast demand.

- *SFO BXR and OAK Inboard - 2020.* Uses the BXR Alternative for SFO, OAK airport layout with inboard parallel runway, and second parallel runway for SJC with traffic level per 2020 forecast demand.
- *SFO BXR and OAK Outboard - 2020.* Uses the BXR Alternative for SFO, OAK airport layout with outboard parallel runway, and second parallel runway for SJC with traffic level per 2020 forecast demand.
- *SFO BXR and OAK Outboard + ATC – 2020.* Uses the BXR Alternative for SFO, OAK airport layout with outboard parallel runway, and second parallel runway for SJC with traffic level per 2020 forecast demand. Impact of new ATC technology modeled for SFO to allow closer spacing of aircraft on final approach and expedited releases of departures. Separation rules for intersection clearing are still respected

Table 6-2
Summary of New Runway Alternatives – Average Delays in Minutes

Alternatives	San Francisco			Oakland			San Jose			Bay Area Airports		
	Arr.	Dep.	Total	Arr.	Dep.	Total	Arr.	Dep.	Total	Arr.	Dep.	Total
All Existing – 1999												
West-VFR	2.31	4.74	3.51	0.51	1.13	0.86	0.63	2.02	1.38	1.57	3.21	2.42
West-IFR	148.	5.78	77.82	1.14	0.88	0.99	0.52	1.90	1.26	86.02	3.66	43.20
SE-IFR	93.7	8.61	51.53	1.58	3.80	2.82	1.50	4.33	3.03	54.66	6.43	29.59
Average	29.0	5.10	17.15	0.65	1.25	0.99	0.69	2.20	1.50	17.00	3.47	9.96
2010 A3 + OAK Existing												
West-VFR	4.86	4.09	4.48	3.25	3.44	3.35	2.19	2.69	2.44	3.90	3.62	3.76
West-IFR	4.88	51.01	27.81	3.04	14.64	9.39	1.72	2.77	2.25	3.76	30.84	17.62
SE-IFR	133.	2.75	68.32	4.62	5.26	4.97	2.02	1.99	2.00	73.77	3.31	37.72
Average	11.4	11.07	11.27	3.30	5.01	4.24	2.15	2.64	2.39	7.49	7.63	7.56
2020 A3 + OAK Existing												
West-VFR	7.57	22.55	15.02	5.13	8.55	6.96	5.32	8.39	6.86	6.43	15.41	11.01
West-IFR	8.75	161.9	84.95	4.12	235.3	128.1	2.96	5.17	4.07	6.25	149.2	79.05
SE-IFR	246.	5.73	126.8	28.28	8.06	17.43	2.36	4.30	3.33	135.33	6.10	69.51
Average	20.0	42.62	31.29	6.31	38.19	23.41	4.94	7.87	6.41	13.11	33.79	23.64
2020 A3 + OAK Inboard												
West-VFR	8.75	21.95	15.32	4.12	2.96	3.50	2.91	4.98	3.95	6.24	12.76	9.56
West-IFR	8.75	162.5	85.25	4.08	4.40	4.25	2.98	5.27	4.13	6.25	82.68	45.15
SE-IFR	246.7	5.68	126.78	28.08	6.05	16.26	2.35	4.62	3.49	135.22	5.56	69.19
Average	21.0	42.22	31.57	5.48	3.32	4.32	2.87	4.97	3.92	12.92	22.86	17.98
2020 A3 + OAK Outboard												
West-VFR	8.75	21.95	15.32	4.12	2.96	3.50	2.91	4.98	3.95	6.24	12.76	9.56
West-IFR	8.76	162.5	85.25	4.12	2.86	3.44	2.99	5.30	4.15	6.26	82.05	44.86
SE-IFR	246.	5.73	126.8	28.28	8.06	17.43	2.36	4.30	3.33	135.3	6.10	69.51
Average	21.0	42.23	31.57	5.49	3.24	4.28	2.87	4.94	3.91	12.92	22.82	17.96
2010 F2 + OAK Existing												
West-VFR	4.63	2.33	3.49	3.31	3.64	3.49	2.19	2.48	2.34	3.79	2.74	3.25
West-IFR	4.71	2.61	3.67	3.33	16.13	10.33	2.18	2.31	2.25	3.84	6.42	5.16
SE-IFR	132.	2.78	67.86	6.01	4.01	4.92	1.38	2.03	1.71	73.46	2.98	37.40
Average	11.2	2.40	6.83	3.47	5.30	4.47	2.12	2.43	2.28	7.39	3.23	5.26
2020 F2 + OAK Existing												
West-VFR	6.41	3.72	5.07	4.94	8.63	6.92	4.41	7.07	5.75	5.58	5.87	5.73
West-IFR	11.8	3.44	7.67	4.95	290.6	158.1	4.20	6.33	5.27	8.35	87.43	48.62
SE-IFR	247.	5.94	127.1	33.41	6.90	19.19	2.36	4.19	3.28	136.8	5.84	70.14
Average	19.6	3.79	11.75	6.56	45.42	27.40	4.23	6.80	5.52	12.79	16.53	14.70
2020 F2 + OAK Inboard												
West-VFR	6.46	3.44	4.96	4.97	4.72	4.84	4.19	6.40	5.30	5.57	4.45	5.00
West-IFR	11.8	3.54	7.72	4.96	6.09	5.57	4.45	6.85	5.66	8.40	5.00	6.67
SE-IFR	247.	5.88	127.2	33.02	4.85	17.91	2.37	4.23	3.30	136.8	5.22	69.83

Table 6-2
Summary of New Runway Alternatives – Average Delays in Minutes (Cont'd)

Alternatives	San Francisco			Oakland			San Jose			Bay Area Airports		
	Arr.	Dep.	Total	Arr.	Dep.	Total	Arr.	Dep.	Total	Arr.	Dep.	Total
Average	19.6	3.58	11.67	6.56	4.91	5.67	4.06	6.25	5.16	12.78	4.55	8.59
2020 F2 + OAK Outboard												
West-VFR	6.46	3.65	5.06	5.05	4.72	4.87	4.34	6.82	5.59	5.62	4.65	5.12
West-IFR	11.8	3.53	7.71	5.04	4.82	4.92	4.05	5.97	5.01	8.34	4.43	6.35
SE-IFR	247.	5.88	127.2	33.02	4.85	17.91	2.37	4.23	3.30	136.8	5.22	69.83
Average	19.6	3.75	11.76	6.64	4.74	5.62	4.17	6.56	5.37	12.82	4.65	8.66
2010 BXR + OAK Existing												
West-VFR	3.23	1.90	2.57	2.27	2.75	2.53	0.92	2.99	1.96	2.51	2.36	2.43
West-IFR	2.71	3.24	2.97	2.34	2.40	2.37	2.00	2.52	2.26	2.47	2.85	2.67
SE-IFR	3.79	5.39	4.59	5.53	5.19	5.34	0.56	1.30	0.93	3.54	4.51	4.04
Average	3.18	2.28	2.73	2.46	2.84	2.67	0.96	2.83	1.90	2.54	2.55	2.54
2020 BXR + OAK Existing												
West-VFR	5.30	2.27	3.79	3.58	17.27	10.92	1.57	7.95	4.77	4.02	7.86	5.97
West-IFR	4.37	8.78	6.56	3.65	234.6	127.5	3.17	7.76	5.47	3.91	74.11	39.66
SE-IFR	18.7	16.58	17.65	8.91	22.26	16.07	0.80	1.64	1.22	12.16	14.99	13.60
Average	5.85	3.99	4.92	3.89	45.99	26.47	1.60	7.43	4.53	4.39	16.93	10.78
2020 BXR + OAK Inboard												
West-VFR	5.29	2.33	3.82	3.47	1.10	2.20	1.86	8.66	5.27	4.05	3.35	3.69
West-IFR	4.22	9.80	7.00	3.58	6.34	5.06	3.18	6.29	4.74	3.82	8.03	5.97
SE-IFR	21.4	13.21	17.34	4.43	5.91	5.22	0.80	1.44	1.12	12.40	8.54	10.43
Average	5.96	4.01	4.99	3.54	2.06	2.74	1.85	7.94	4.91	4.41	4.30	4.35
2020 BXR + OAK Outboard												
West-VFR	5.29	2.27	3.79	1.22	1.21	1.21	1.56	8.35	4.97	3.40	3.28	3.34
West-IFR	4.22	9.96	7.08	4.16	3.02	3.55	3.19	10.77	7.00	3.97	8.12	6.09
SE-IFR	23.3	21.06	22.22	8.81	3.65	6.04	0.81	1.61	1.21	14.54	11.79	13.14
Average	6.06	4.39	5.23	2.04	1.59	1.79	1.60	7.96	4.79	4.02	4.35	4.19
2020 BXR + OAK Out/Tech												
West-VFR	5.26	1.90	3.59	1.22	1.06	1.13	1.56	8.14	4.86	3.38	3.01	3.19
West-IFR	2.33	8.76	5.53	4.14	3.01	3.53	3.19	6.51	4.86	2.99	6.60	4.83
SE-IFR	1.37	5.54	3.44	8.84	3.67	6.07	0.81	1.65	1.23	3.19	4.15	3.68
Average	4.62	3.12	3.87	2.03	1.46	1.73	1.60	7.52	4.57	3.27	3.59	3.44

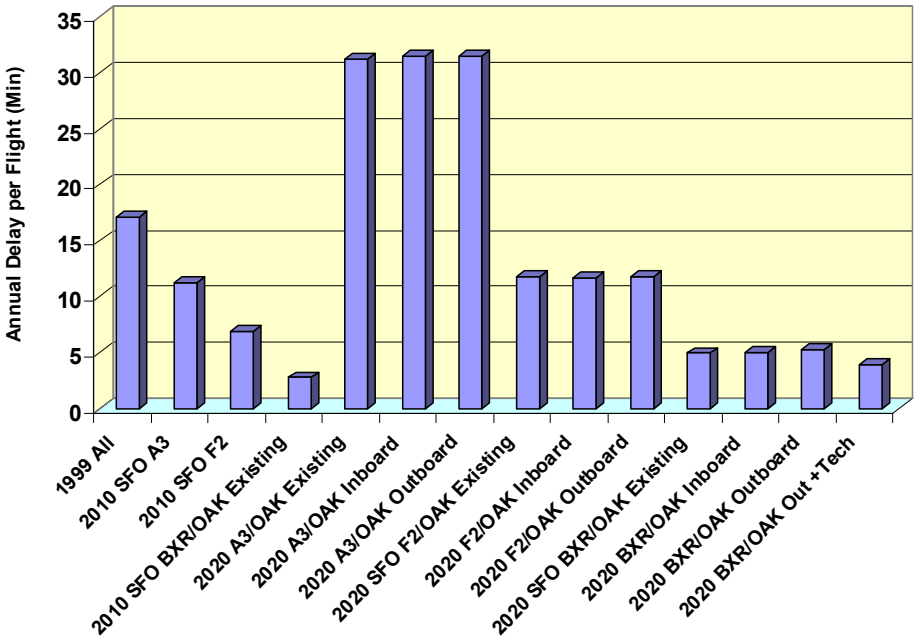


Figure 6-5 San Francisco Airport – Average Delay By Runway Configuration Alternative

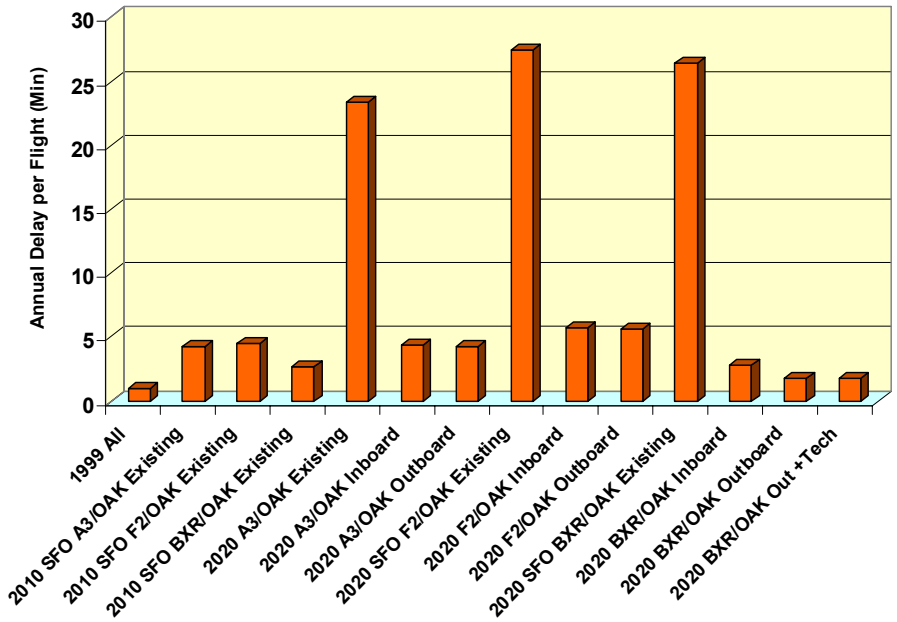


Figure 6-6 Oakland Airport – Average Delay By Runway Configuration Alternative

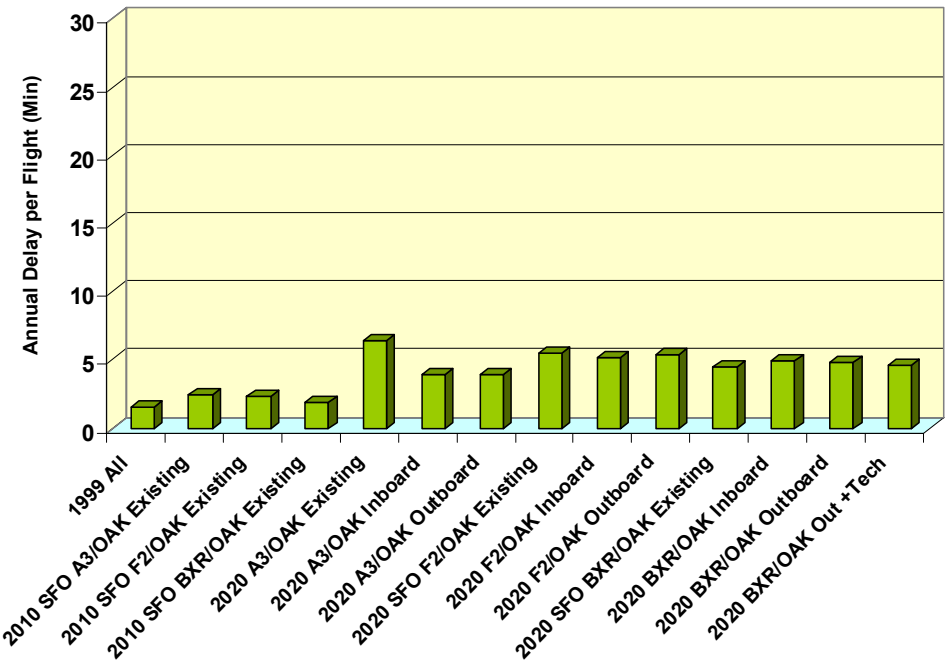


Figure 6-7 San Jose Airport – Average Delay By Runway Configuration Alternative

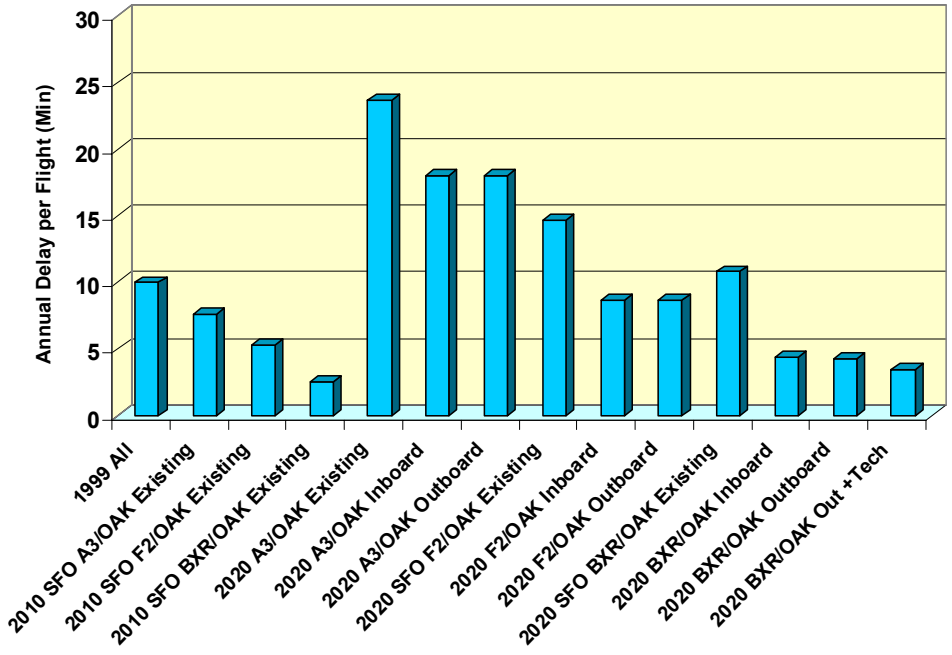


Figure 6-8 Bay Area Airports – Average Delay By Runway Configuration Alternative